Correspondence

The Editorial Board will be pleased to receive and consider for publication correspondence containing information of interest to physicians or commenting on issues of the day. Letters ordinarily should not exceed 600 words, and must be typewritten, double-spaced and submitted in duplicate (the original typescript and one copy). Authors will be given an opportunity to review any substantial editing or abridgement before publication.

Ocular Effects of Gravity Inversion

TO THE EDITOR: In a letter to the editor entitled "More on Gravity Inversion" in the August 1984 issue,[1] Goldman and colleagues conclude that oscillating about a horizontal axis during gravity inversion instead of hanging statically is a safe activity and specifically poses no risk to the eyes. They allude to different results in a new study and they state that "the hydrostatic increase in intraocular and central retinal artery pressure balance and protect each other. . . . Each prevents the other from damage." Unfortunately, this conclusion is unsupported by facts.

In the original study that Goldman co-authored,[2] he and his colleagues determined that the intraocular pressure (IOP) increased 84% from an average of 19 to 35 mm of mercury after three minutes of static inversion and suggested that because of the significant elevation of IOP, visual fields and tonometry be carried out before embarking on an inversion program. In the "new" work that was alluded to in the letter and now published,[3] he and his associates reported that with oscillation IOP rose from a preinversion level of 17 to 33, 32 and 31 mm of mercury at 5, 10 and 15 minutes, respectively. The net increases were thus 94%, 88% and 82%, depending upon the duration of inversion. The "new" IOP results are virtually identical with those found in their earlier study; yet, despite this fact, Goldman and associates reach completely different conclusions and now declare that inversion with oscillation is safe. I find this a most peculiar turn of events.

My ophthalmologist colleagues and I have investigated many of the ocular effects of gravity inversion.[4-6] We recently have evaluted optic nerve function in normal subjects during inversion and have demonstrated significant depressions of the amplitude of visual signals conducted from the eyes to the occipital cortex (pattern reversal visual evoked potentials) and have also demonstrated visual field defects. These alterations in function, although they disappear upon returning to the upright position, are undoubtedly related to the intraocular pressure rise during inversion and are found also in patients with glaucoma without inversion. Hence, the statement that the body completely compensates for the intraocular pressure rise during inversion activities by increasing perfusion is mere fantasy with respect to these functional tests.

It remains uncertain whether healthy persons who use gravity inversion equipment for short daily intervals over several years will suffer any permanent damage from increased IOP. Nevertheless, enthusiasts of inversion ought to at least be informed of the potential risk to the eyes, although it may be limited. Furthermore, this risk can probably be reduced by decreasing the inversion times to short 10 or 15 minute intervals. Since elevated IOP is usually asymptomatic, the authors' previous suggestion[2] that potential inversion devotees at least have an initial baseline intraocular pressure measurement to determine if they are at special risk is appropriate. This seems a more prudent and responsible approach than to come to a totally different conclusion, based on essentially unchanged data and mere speculation, as the authors did in their letter.

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Dr Goldman Replies

TO THE EDITOR: Thank you for the opportunity to respond to Dr Friberg's comments. I think some points should be clarified. When we published the first study ever to examine the physiologic effects of static inversion (utilizing gravity inversion boots) several years ago, we were at first alarmed at our findings, as we did not expect to see such dramatic elevations in intraocular pressure (IOP), central retinal arterial and systemic blood pressure.[1] Upon further examination we attempted to note responses to other forms and techniques of inversion (compared with vigorous exercise levels,[2] in hypertensives[3] and oscillating[4,5]). Throughout all our studies we have always stressed that all participants undergo a cardiovascular and ocular examination.

We were, however, dismayed by the sensationalized media coverage of our papers and other research papers proclaiming that this type of adjunct training was not safe for anyone. We then set out to find if oscillating techniques would afford any variance from our original data in a pilot study. As Dr Friberg so astutely pointed out, our data in the mentioned pilot study[4] (later performed with well-trained subjects) were